

REMARKS

Claims 1-11, 14-19 and 28 have been previously canceled; no claims are currently canceled. Claims 12, 29 and 30 have been amended by way of this response. No new claims have been added. Thus, claims 12, 13, 20-27, 29 and 30 are currently pending and presented for examination. Applicant respectfully requests reconsideration and allowance of the pending claims in view of the amendments and the remarks.

Response to rejections under 35 U.S.C. 103:

A. Claims 12-13, 22-27, 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikuchi et al. (US 2003/0162078) in view of Hulswitt et al. (US 4,569,391). Claims 20-21 are rejected as being unpatentable over Kikuchi et al. in view of Hulswitt et al. and further in view of Yasuo et al. (US 2002/0187379).

B. Claims 12-13 and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mattejat et al. (US 5,472,801) in view of Hulswitt et al. Claims 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mattejat et al. in view of Yasuo et al.

C. Claims 24-27, 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mattejat et al.

Response to rejections under A.

Claims 12-13, 20-21, 22-27, 29 and 30 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Kikuchi et al. in view of Hulswitt et al. or over Kikuchi et al. in view of Hulswitt et al. and further in view of Yasuo et al..

Applicant respectfully submits herewith a declaration of prior inventorship under 37 C.F.R. 1.131 to antedate and overcome Kikuchi et al. (US 2003/0162078 having an earliest US filing date Feb. 26, 2003). In view of this declaration, reconsideration and withdrawal of the rejection under 35 U.S.C. 103(a) citing Kikuchi et al. is respectfully requested.

Response to rejection under B.

Claims 12-13 and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mattejat et al. (US 5,472,801) in view of Hulswitt et al. Claims 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mattejat et al. in view of Yasuo et al.

Applicant's separator 1 is formed from assembled plates 3 and 4. When coolant flows from a depression 12 of the plate 3 into the opposite plate 4, the coolant is automatically directed from one subchamber 10 to an adjacent subchamber 11. The coolant therefore continuously undergoes a change of direction perpendicular to the separator 1. In addition, the coolant is also continuously diverted in directions parallel to the center plane M by the offset arrangement of the depressions 12. As can be seen from FIG 2, the embossings 5 of each plate 3, 4 do not touch each other as they are offset relative to one another. Even if coolant is introduced into the separator 1 at one location only, it is distributed widthwise within a short distance. Flow takes place with a uniform flow resistance within the surface of the separator 1. There is no need for any distributor elements or spacers between the plates 3, 4 or between adjacent electrolyte-electrode units 2.

In the instant office action, the examiner notes that Mattejat et al. would disclose that the fluid chamber for the coolant has two subchambers separated by a central plane comprising an overflow section to direct the coolant flow alternately through the two subchambers (Mattejat et al., col. 7, lines 49-66 and Figs. 4-6). Applicant respectfully disagrees. Mattejat et al. discloses in col. 7, lines 41-48, hemispherical protuberances or half-round groove-like protuberances or frustoconical protuberances in the plates 40, 42, having structures which are staggered with respect to one another, in order to space the plates apart. As can be seen in FIG 4-6, these protuberances touch each other in order to space the plates apart. For example, as described in col. 7, lines 60-65, a truncated cone of the plate 40 is disposed concentrically with the equilateral triangle that is formed of three truncated cones of the plate 42 and at the same time rests on the three truncated cones. As the protuberances touch each other, a coolant cannot flow alternately through the subchambers of the two plates.

Further, the examiner notes that Mattejat et al. does not teach that the embossings of the plates are offset relative to one another such that one circular depression of the first plate is connected to three circular depressions of the second plate by an overflow section and that it

would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Mattejat et al. and Hulswitt et al. Applicant respectfully disagrees as Hulswitt et al. fails to remedy the deficiencies of Mattejat et al. noted above regarding the claimed invention.

Hulswitt et al. describes a compact heat exchanger with a plurality of parallel spaced plates, the spaces between the plates defining fluid receiving passageways. Each plate includes protuberances staggered with respect to the protuberances on each adjacent plate so that the protuberances of one plate rest against the adjacent plate between the protuberances thereof (Hulswitt et al., abstract). As can be seen in Figs. 10 and 11 of Hulswitt et al., the depressions 40/protuberances 41 form several subchambers 38 and 39 (ref. no. 38 and 39 being passageways) because the apexes of protuberances 41/44 rest against the flat surface of plates 35/33 (Hulswitt et al., col. 4, lines 1-7). Since the protuberances 41/44 rest against the plates 35/33, the subchambers (passageways 38/39) do not comprise an overflow section configured to direct the coolant flow alternately through the subchambers. The coolant flows in basically one direction from the coolant ingress to the coolant egress but cannot flow through all the subchambers 38/39 in different directions. For example, the coolant cannot flow in a direction perpendicular to the flow direction from coolant ingress to coolant egress.

Further, Hulswitt et al. does not teach or suggest that the protuberances of the plates are offset relative to one another such that one circular depression of the first plate is connected to three circular depressions of the second plate by an overflow section. The examiner refers to Hulswitt et al., col. 2, lines 37-48, col. 5, lines 7-16 and Figs. 2-11). Col. 2, lines 37-48 recites a brief description of the drawings and col. 5, lines 7-16, reads as follows:

It should be evident that when fluids enter passageways 38 and 39 they are confronted with a unique pattern of interfering protuberances coming both downwardly from the plate above and upwardly from the plate below. The turbulence created as the fluids make their sinuous path from input to output greatly enhances the heat transfer characteristics of the device. In addition, the increased surface areas of the plates afforded by the protuberances and depressions also enhances the heat transfer characteristics. Furthermore, the fact that

It is respectfully submitted that both Mattejat et al. and Hulswitt et al. do not teach or suggest applicant's elements that

"...wherein the embossings are formed as circular depressions, and wherein the embossings of the plates are offset relative to one another such that one circular depression of the first plate is connected to three circular depressions of the second plate by an overflow section, thereby forming a reticulated cooling chamber structure covering an entire surface of the separator; ...

the first fluid chamber for the coolant has two subchambers, each subchamber facing one of the two plates, where the subchambers are arranged adjacent and non-planar to each other and are separated by a central plane comprising an overflow section configured to direct the coolant flow alternately through the two non-planar subchambers."

Thus, applicant respectfully requests to withdraw the rejections under 35 U.S.C. 103(a).

Response to rejection under C.

Claims 24-27, 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mattejat et al.. For at least the reasons discussed in connection with the response to rejections under B., applicant respectfully submits that these claims are patentable and respectfully request the examiner to withdraw the rejections under 35 U.S.C. 103.

In view of the above, independent claims 12, 29 and 30 are patentable. Furthermore, claims 13 and 20-27, which depend on claim 12, are also patentable at least based on their dependence from claim 12 as well as based on their own merits. Thus, applicant respectfully requests the examiner to withdraw the rejections.

Conclusion

For at least the foregoing reasons, it is respectfully submitted that the rejections set forth in the outstanding office action are inapplicable to the present claims. Applicant respectfully requests allowance of the pending claims. Please grant any extensions of time required to enter this paper. The commissioner is hereby authorized to charge any appropriate fees due in connection with this paper, including fees for additional claims and terminal disclaimer fee, or credit any overpayments to deposit account no. 19-2179.

Respectfully submitted,

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